Area Wide Optimization Program

Individual Program Background Information 2019

WV-DHHR, Bureau for Public Health, Office of Environmental Health Services

Official Recognition of AWOP

WV Start Date: 2004 along with Region 3. Program exposure in WV Rural Water Assn magazine, multiple seminars, Awards Program, and Operator Certification Program courses/classes

Official Adoption of AWOP Goals

WV Goals adopted in 2004 for settled water and CFE only. Communication of goals is accomplished in annual WTP site visit reports, and on Turb-OPT summary chart shared with PWSs. Achieving goals, SNSV deficiencies, past violations are reviewed for the awards program.

National Optimization Goals <u>adopted</u> by your PWSS Program – Check all that apply:

<u>Water Treatment Plants</u>

Microbial (Turbidity): Raw Water____ Individual Settled__X__ CFE__X_ IFE____
Post BW w/FTW____ Post BW wo/FTW____ Disinfection (CT) ____

DBPs (TTHM/HAA5): Plant Effluent____ Enhanced Coagulation____ Disinfection____

Chloramine Application: Ammonia Control____ Dosing (Chlorine & Ammonia) ____

<u>Distribution Systems*</u>

Individual Site DBPs ____ Long Term System DBPs____ Tank Operations____
Secondary Disinfection, Free Chlorine ____
Secondary Disinfection, Chloramines (monochloramine, Ammonia & Nitrite) ____

*****West Va encourages PWS to establish site specific goals

Modifications to the national goals or other optimization goals utilized by your Agency:

85% water accountability target is a sister agency goal is promoted in reports.
Post BW return-to-service goals discussed

Description of *Current* AWOP Team Members and Responsibilities

1. Initial Contact: AWOP Team Co-Leader: Mike Hawranick, P. E., District Engineer, PBT Trainer/Facilitator, 0.1 FTE (role limited due to staff reduction in Fairmont District Office)
2. AWOP Team Co-Leader: JD Douglas, P. E., District Engineer, PBT Trainer/Facilitator, < 0.1 FTE (role limited due to staff reduction SA District Office)
3. Alan Marchun, District Engineer, E.I.T, PBT Facilitator, < 0.1 FTE (role limited/staff reduction Kearneysville District Office)
4. Paul Daniels, P. E., Distr Office Coordinator, < 0.1 FTE (role limited/staff reduced Central Office)
5. Seth Myers, Ph. D., Environmental Resource Specialist 2, PBT Facilitator, < 0.1 FTE (role limited due to staff reduction Fairmont District Office)

Others:
Bertis McCarty, WV Rural Water Assn. Circuit Rider, DSO facilitator, Mary Hutson, WV RCAP Executive Director, co-presenter, Meredith Vance, WV BPH-OEHS-EED acting director

Description of *Former* AWOP Team Members:

1. AWOP Team Co-Leader: Chris Farrish, P. E., District Engineer, PBT Trainer/Facilitator. transferred & promoted at WV DEP-AML
2. Patrick Murphy, WV BPH-OEHS-EED director for <2 yrs, transferred to WV DEP-AML
3. Jim Ellars, P. E., District Office Coordinator for <2 yrs, transferred to WV PSC, < 0.1 FTE

Inventory of State-Wide Treatment Facilities[1]	**Number**
Rapid rate filtration treatment plants[2,3]	129
Utilizing static settling without tubes or plates	40
Utilizing static settling with tubes or plates	75
Utilizing sludge blanket clarification (upflow, pulsator)	2
Utilizing contact adsorption clarification	6
Utilizing sludge recirculation (including ballasted clarification)	0
Utilizing DAF, or other alternative clarification process	1
Utilizing direct/in-line filtration	6
Utilizing packaged filtration (package plants)	12
Slow sand filter plants	1
Diatomaceous earth filter plants	0
Membrane treatment plants	9
Bag or cartridge filtration plants	0
Primary disinfectant	
Free chlorine	124
Chloramines	1
Ozone	
UV	
Secondary disinfectant	
Free chlorine	
Chloramines	

[1]Limited to surface water treatment plants (includes surface, GUDI, blended sources).
[2]All surface water treatment plants, except cartridge, membrane and slow sand.
[3]When plant utilizes multiple treatment processes or configurations identified below, include all in inventory, e.g., a package plant that utilizes a CAC will be included as a rapid rate plant using CAC and packaged filtration.

AWOP Vision:

AWOP continues to be a platform to promote "Public Health Protection" to PWSs & agency personnel. W. Va. AWOP vision includes: (1) Using tools provided to prioritize our agency's efforts/assets, (2) Encourage use of the tools/concepts by PWSs, (3) Review new trends/tools and include in program functions as appropriate, & (4) Continue dialogue with the AWOP network.

Status Component Implementation:

Data is transferred by DW staff from MORs to OAS (turbOPT), compiled along w/ recent violations & un-resolved SNSV significant deficiencies. Individual scorecards are generated, and a master list is compiled and shared in-house, with tech assistance providers, and individual water systems.

Targeted Performance Improvement (TPI) Implementation:

PBTs: (currently: DSO/DBP meetings at wholesaler/consecutive PWSs and 1 on 1, previously: microbial & DBP), enhanced Sanitary Surveys, Site Visits, & technical assistance. Technical Assistance: Currently promoting "Special Studies" for DBP and disinfectant residual improvement.

AWOP Maintenance Component Implementation:

Integrate

AWOP has been integrated into the PWSS Program:
Plan Reviews_X___ Permitting_X___ Capacity Development____ Operator Training__X__ Technical Assistance__X__ DWSRF Prioritization__X__ Enforcement_X___ Sanitary Surveys__X__ Other(identify)_____

Enhance

AWOP enhancements implemented.

Previously added settled water to our MORs. Envision adding IFE and trend charts to surface water MOR's. Management support provided, 20 hydrant flushers for DSO participants, laboratory equipment for District Offices, and state laboratory testing support during DBP-PBT.

Sustain

Implementation activities to sustain AWOP.

Promote DSO best practices, continue awards program, seminar presentations, & continue to share microbial status component.

Lessons Learned:

1. Share success stories/award winners/high public health risk PWSs with DW staff
2. Gains (and losses) are made 1 PWS at a time, one DW employee at a time.
3. Data based decision making is always good.

Attachment I: Optimization Goals Adopted by the NOLT

Category	Goal	Applies to	Description
Microbial	Minimum Data Monitoring Goal Raw Water Turbidity	Rapid Rate Filtration Plants	— Record maximum daily raw water turbidity.
Microbial	Individual Sedimentation Basin Performance and Monitoring Goals	Rapid Rate Filtration Plants	— Settled water turbidity ≤ 2 NTU in 95% of readings when the annual average raw turbidity is > 10 NTU. Optimization is based on the daily maximum values recorded from all readings. — Settled water turbidity ≤ 1 NTU in 95% of readings when the annual average raw turbidity is ≤ 10 NTU. Optimization is based on the daily maximum values recorded from all readings. — Record individual sedimentation basin effluent turbidity readings at intervals of 4-hours or less if taking grab samples, or 15 minutes or less for continuous monitoring.
Microbial	Individual and Combined Filter Performance and Monitoring Goals	Rapid Rate Filtration Plants	— Combined filter effluent turbidity ≤ 0.10 NTU in 95% of readings. Optimization is based on the daily maximum values recorded from all readings. — Individual filter effluent turbidity ≤ 0.10 NTU in 95% of readings (excluding 15-minute period following filter backwash). Optimization is based on the daily maximum values recorded from all readings. —Post backwash individual filter effluent turbidity for filters <u>without</u> filter-to-waste capability: Maximum individual filter effluent turbidity following backwash ≤ 0.30 NTU and achieve ≤ 0.10 NTU within 15 minutes. —Post backwash individual filter effluent turbidity for filters <u>with</u> filter-to-waste capability: Minimize individual filter effluent turbidity during filter-to-waste period and record maximum value. Return the filter to service at ≤ 0.10 NTU. — Record individual and combined filter effluent turbidity readings at intervals of 1-minute or less for continuous monitoring.
Microbial	Disinfection Performance and Monitoring Goals	Rapid Rate Filtration Plants	—Meet CT requirements to achieve inactivation of *Giardia* and viruses plus a system-specific factor of safety. — Record disinfectant residual, temperature, and pH at maximum daily flow for CT calculations.
Disinfection By-Product	Plant Effluent Disinfection Byproducts (DBPs) Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—System Specific Targets: Could be a discrete value or range that is based on a running annual average. Recommended goal value/range should be 30% to 50% of long term LRAA goals (e.g., 20-30 ppb for TTHM, 15-20 ppb for HAA5). —Collect quarterly TTHM and HAA5 samples at the plant effluent and distribution system compliance sites.
Disinfection By-Product	Enhanced Coagulation Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—Meet Stage 1 D/DBP Rule TOC removal requirements for enhanced coagulation, which are based on source water alkalinity and TOC levels, or an alternative compliance criterion, as a running annual average (RAA) of the performance ratio (actual TOC removal/required TOC removal) plus a factor of safety of 10% (or performance ratio ≥ 1.1). —Collect monthly total organic carbon samples for raw and treated water (only applies to parent systems).
Disinfection By-Product	Disinfection Performance and Monitoring Goal	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—Meet CT requirements to achieve inactivation of *Giardia* and viruses plus a system-specific factor of safety. —Record disinfection residual, temperature, and pH at maximum daily flow for CT calculations (only applies to parent systems).

Distribution System	Disinfection Byproducts Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize any Secondary Disinfectant	—Individual Site Goal: Quarterly Maximum Locational Running Annual Average TTHM/HAA5 values not to exceed 70/50 ppb. —Long-Term System Goal: Average of Maximum Locational Running Annual Average TTHM/HAA5 values not to exceed 60/40 ppb (the average of the last 8 quarters cannot exceed 60/40 ppb). —For systems in compliance with the TTHM and HAA5 MCLs, collect quarterly DBP samples at all compliance locations; for systems not in compliance, collect monthly samples.
Free Chlorine Distribution System	Disinfection Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Free Chlorine as a Secondary Disinfectant	—Maintain ≥ 0.20 mg/L free chlorine residual at all monitoring sites in the distribution system, at all times. —Monitoring should be performed at least monthly, but more frequently at critical times (i.e., summer months). —Sample locations should include bacteriological and DBP compliance sites, all distribution system entry points (e.g., plant effluent, consecutive system connections), all tanks (preferably while draining), and identified critical sites base on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total).
Plants that Utilize Chloramine	Disinfection: Ammonia Control Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	—Maintain a detectable free ammonia residual in the plant effluent ≤ 0.10 mg/L as NH3-N. —Monitor free ammonia at least once per day in the plant effluent. • The monitoring frequency may be adjusted based on the variability observed over an extended period of time. • Free ammonia may be monitored in the source water periodically (e.g., once per week) to assess variability.
Plants that Utilize Chloramine	Operational Guideline Chlorine and Ammonia Dosing	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	—Maintain a chlorine-to-nitrogen mass ratio between 4.5:1 and 5.0:1 (or chlorine-to-ammonia mass ratio between 3.7:1 and 4.1:1), which should result in a detectable free ammonia in the plant effluent that is ≤ 0.10 mg/L as NH3-N.
Chloramine Distribution System	Disinfection: Monochloramine and Nitrification-Related Parameters Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	—Maintain ≥ 1.50 mg/L monochloramine residual at all monitoring sites in the distribution system, at all times, to provide a disinfection barrier against both microbial contamination and nitrification prevention. —Monitor monochloramine, free ammonia, and nitrite in the distribution system and at the entry points (to establish a baseline). • Monochloramine and free ammonia should be monitored at all sample locations. • Nitrite should be monitored at sample locations where monochloramine is ≤ 1.50 mg/L; nitrate may also be monitored, to further assess nitrification. • Sample locations should include bacteriological and DBP compliance sites, all distribution system entry points (e.g., plant effluent, consecutive system connections), all tanks (preferably while draining), and identified critical sites base on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total). • Monitoring should be done at least monthly, but more frequently at critical times (e.g., summer months).
Distribution System	Operational Guidelines Tank Operations	Parent and Consecutive Water Systems that Contain Storage Tanks (any secondary disinfectant)	—Maintain an average turnover time < 5 days; or establish and maintain a water turnover rate at each storage facility. —Maintain good mixing (i.e., Performance Ratio ≥ 1) at all times; for tanks where the PR cannot be calculated, adequate mixing (i.e., uniform water quality) should be confirmed by alternate means (e.g., tank profiling/water quality sampling).